

CLAIMS

1. GENE EXPRESSION CASSETTE, characterized by the fact that comprises one or more genes encoding one or more enzymes selected from the group that contains: myo-inositol 1-phosphate synthase (EC: 5.5.1.4),
5 myo-inositol monophosphatase (EC: 3.1.3.25), myo-inositol oxygenase (EC: 1.13.99.1), β -glucuronidase (EC: 3.2.1.31), glucuronokinase (EC: 2.7.1.43), glucuronosyltransferase (EC: 2.4.1.17), glucuronate-1-phosphate uridyltransferase (EC: 2.7.7.44), phosphoglucomutase (EC: 5.4.2.2), UDP-glucose pyrophosphorylase (EC: 2.7.7.9), UDP-glucose dehydrogenase (EC: 1.1.1.22),
10 UDP-D-glucuronate carboxylase (EC: 4.1.1.35), 1,4- β -D-xylan synthase (EC: 2.4.2.24), and cellulose synthase (EC: 2.4.1.1).

2. CASSETTE, according to claim 1, characterized by the fact that the said group contains: myo-inositol oxygenase (EC: 1.13.99.1), β -glucuronidase (EC: 3.2.1.31), glucuronokinase (EC: 2.7.1.43), glucuronate-1-phosphate uridyltransferase (EC: 2.7.7.44), UDP-glucose pyrophosphorylase (EC: 2.7.7.9), UDP-glucose dehydrogenase (EC: 1.1.1.22), and UDP-D-glucuronate carboxylase (EC: 4.1.1.35).
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3. CASSETTE, according to claim 1, characterized by the fact of being cloned into the transformation binary vector and introduction into the bacterium *Agrobacterium tumefaciens*.
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4. CASSETTE, according to claim 1, characterized by the fact that the said enzymes are involved in the biosynthesis of hemicelluloses, cellulose and/or uronic acids.

5. CASSETTE, according to claim 4, characterized by the fact that the hemicelluloses are xylans.
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6. CASSETTE, according to claim 4, characterized by the fact that an uronic acid is glucuronic acid.

7. USE OF ONE OR MORE GENE EXPRESSION

CASSETTES, characterized by the fact that it is for the overexpression or repression of the genes described in claim 1.

8. METHOD FOR GENETIC TRANSFORMATION IN PLANT CELLS, characterized by the fact of introducing one or more cassettes, according to one of claims 1 to 6, into the plant genome.

9. METHOD, according to claim 8, characterized by the fact that the cassette is introduced in the cell by electroporation, bioballistics, microinjection, macroinjection or via *Agrobacterium tumefaciens*.

10. METHOD, according to claim 9, characterized by the fact that the cassette is introduced into the cell by *Agrobacterium tumefaciens*.

11. METHOD, according to claim 8, characterized by the fact of changing the metabolic pathway for the biosynthesis of hemicelluloses, cellulose and/or uronic acids.

12. METHOD, according to claim 8, characterized by the fact that the said plant cell is a cell from any part of the plant, such as the root, stem, fruit, leaf, seed, or flower.

13. METHOD TO OBTAIN GENETICALLY MODIFIED PLANT, characterized by the fact that comprises the following stages:

a) genetic transformation of plant cells according to one of claims 8 to 12;

b) regeneration of stage (a) cells;

(c) expression of the DNA introduced into the cells of stage (b) in sufficient amount to substantially change the metabolic pathway for the biosynthesis of hemicelluloses and/or cellulose and/or uronic acids; and

d) obtention of the modified plant.

14. METHOD, according to claim 13, characterized by the fact that the said modified plant is a cell, an organ, a tissue, a seed, the entire plant, or its derived plants.

15. GENETICALLY MODIFIED PLANT, characterized by the fact of containing one or more expression cassettes according to one of the claims 1 to 6.

16. GENETICALLY MODIFIED PLANT, characterized by the
5 fact of being originated from the method according to claim 13.

17. PLANT, according to one of the claims 15 or 16, characterized by the fact of being an angiosperm.

18. PLANT, according to one of the claims 15 or 16, characterized by the fact of being a gymnosperm.

10 19. PLANT, according to claim 17, characterized by the fact of being Eucalyptus.

20. USE OF THE PLANT, according to one of the claims 15 to 19, characterized by the fact of being used for obtaining wood and/or cellulose.

15 21. DERIVED PLANTS, characterized by the fact of being originated from the genetically modified plant, according to one of the claims 15 or 16.

22. GENETICALLY MODIFIED SEED, characterized by the fact of comprising one or more expression cassettes according to one of the claims 1 to 6.

20 23. GENETICALLY MODIFIED SEED, described in claim 12, characterized by the fact of comprising one or more expression cassettes according to one of the claims 1 to 6.

24. GENETICALLY MODIFIED SEED, obtained from the method of claim 13, characterized by the fact of presenting change in the
25 biosynthesis of cellulose, hemicelluloses and/or uronic acids.

25. USE OF THE GENETICALLY MODIFIED SEED, according to one of the claims 22 or 23, characterized by the fact of being used to generate plants.

26. WOOD, characterized by the fact of being obtained from the genetically modified plant according to one of the claims 15 or 16.

27. USE OF THE WOOD, obtained from the genetically modified plant according to one of the claims 15 or 16, characterized by the fact of being destined for civil engineering, shipbuilding, furniture and utensil manufacturing, and for the production of cellulose pulp and paper.

28. USE OF THE WOOD, according to claim 27, characterized by the fact of being for the production of cellulose pulp and paper.

29. CELLULOSE, characterized by the fact of being obtained from the wood according to claim 26.

30. USE OF THE CELLULOSE, obtained from the wood according to claim 26, characterized by the fact of being used for the manufacture of paper.

31. PAPER, characterized by the fact of being obtained from the wood or cellulose according to one of the claims 26 or 29, respectively.

32. USE OF THE PAPER, obtained from the wood or cellulose according to one of the claims 26 and 29, respectively, characterized by the fact of being for civil engineering, furniture industry, printing paper, packaging and absorbing paper.

33. USE OF THE PAPER, obtained from the wood or cellulose according to one of the claims 26 and 29, respectively, characterized by the fact of being for printing paper, packaging and absorbing paper.

34. METHOD FOR MODULATING THE POLYPEPTIDES LEVEL IN PLANTS, the said polypeptides being involved in the biosynthesis of hemicelluloses, cellulose and/or uronic acids, characterized by the fact of comprising the following stages: a) introduction of one or more gene expression cassettes into the plant cell according to claim 1; b) regeneration of the plant cell; c) induction of the expression of the said polypeptides during a sufficient

period to modulate the level of biosynthesis of hemicelluloses, cellulose and/or uronic acids in the said plants.